

Doropygelia thorellii Aurivillius. Found only in Fox Channel but taken by the Ingolf Expedition from Davis Strait and by Schmidt from southeast of Iceland. It is found in the branchial cavity of ascidians.

Herpyllobius arcticus Steenstrup & Lütken. A single female was found on the annelid, *Harmothoë imbricata*, on the east coast of Greenland. The Ingolf Expedition reported the species from Davis Strait and the west coast, all the annelid hosts belonging to the genus *Harmothoë*.

ICHTHYOLOGY.—*A new polynemid fish collected in the Sadong River, Sarawak, by Dr. William T. Hornaday, with notes on the genera of Polynemidae.*¹ GEORGE S. MYERS, United States National Museum. (Communicated by A. WETMORE.)

Fifty-nine years ago, William T. Hornaday, now the honored director-emeritus of the New York Zoological Park, travelled in India, the Malay Peninsula, and Borneo to collect natural history specimens for Ward's Natural Science Establishment of Rochester. His book dealing with that trip, *Two Years in the Jungle* (New York, 1885), is now one of the classics of zoological exploration in Asia. The fishes collected by Dr. Hornaday became the property of the United States National Museum, in which institution he remained for several years as chief taxidermist. Some of the fishes were identified by Dr. Tarleton Bean and the rest have recently been determined by the present writer. One species, a remarkable *Polynemus*, appears to be unnamed more than half a century after its collection.

***Polynemus hornadayi*, n. sp.**

Holotype.—U.S.N.M. 100632, a specimen 195 mm standard length and 260 mm including caudal fin, obtained by W. T. Hornaday on October 2, 1877, while fishing with poison, in the Ensengi River, a large creek emptying into the Sadong River from the west about six miles below Simujan, southwestern Sarawak, Borneo. Dr. Hornaday described the Ensengi as a stream 40 feet wide and 8 to 10 feet deep, with murky water and swift current. The holotype is the identical specimen illustrated on the plate facing page 386 of *Two Years in the Jungle*, from a pen and ink drawing of the late Dr. Frederic A. Lucas. The figure is reproduced here.

Paratypes.—U.S.N.M. 35719, ten smaller specimens, obtained at the same place and on the same date. One of these is now in the British Museum.

Diagnosis.—A species of *Polynemus* allied to *P. hilleri* Fowler, *P. paradiseus* Linnaeus, and *P. dubius* Bleeker in the presence of but seven dorsal spines, but differing in the very tiny scales, 94 to 97 in the lateral line to caudal base and 31 to 35 in transverse series from origin of first dorsal to pelvic origin.

Description.—Dorsal VII–I, 15½. Anal II—11½. Pectorals 16 to 18, with 7 filaments. Pelvics I–5. Lateral line scales with pores, from upper end of gill opening to end of hypural fan, 94 to 97. Transverse scales from origin of first dorsal to pelvic base 8 to 9/1/21 to 25. Gill rakers fairly long, 12 on upper and 15 on lower limb of first arch.

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Greatest depth approximately equal to head length, 4.8 in standard length. Eyes minute, 9.5 in head length, 2.9 to 3.1 in the convex interorbital space, approximately 2 in snout, and nearly 7 in postorbital part of head. Mouth rather large, reaching far behind eye. Maxillaries scaly, 1.8 in head. Upper jaw not emarginate at symphysis. Anterior and posterior nostrils close together, immediately in front of eye. Preopercular edge finely denticulated for some distance above its rounded posterior angle. Upper lip scarcely evident; lower well developed, but interrupted at symphysis. A narrow band of extremely fine, villiform teeth, narrowly interrupted at the symphysis, in each jaw; the band is wider towards the front but the teeth do not extend to the outside of the jaws. Vomer with a narrow, transverse, crescentic (or angled) patch of similar teeth. An oblong patch, rounded in front and acu-

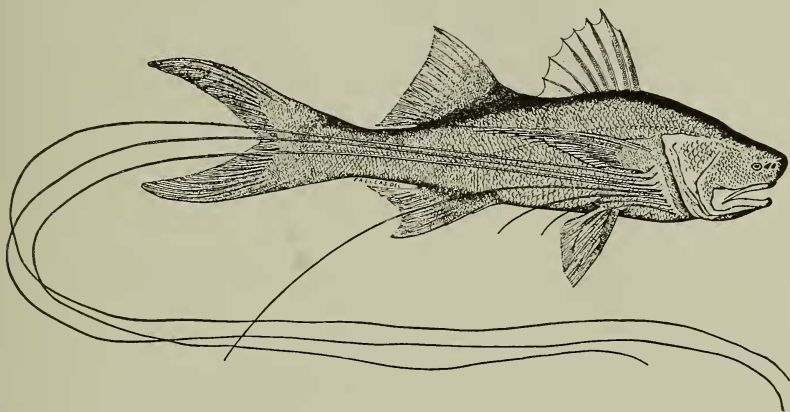


Fig. 1.—*Polynemus hornadayi*, new species. Holotype. After Hornaday, from a drawing by the late Dr. Frederic A. Lucas. Reproduced by permission of Charles Scribner's Sons, New York.

minate behind, of similar teeth on each palatine, and a very small, narrow patch on each pterygoid.

Origin of first dorsal very slightly behind that of pectorals. Spines of first dorsal slender and somewhat flexible, the first one nearly three fourths as long as the second. Second spine longest, a little shorter than head, minus snout. Origin of second dorsal slightly in advance of that of anal. Soft dorsal, anal, and caudal densely and finely scaled for more than half their lengths. A few rows of fine scales along and behind each spine of first dorsal, and along pelvic spine. Caudal long and very deeply forked, with pointed lobes. Pectoral fin pointed, straight, the upper part of its base above mid-line of body depth, its rays all simple; the fin is approximately 1.5 times as long as head and reaches the posterior third of the soft dorsal base. The two upper pectoral filaments exceed the caudal tip by more than one and two-thirds the total length of the fish (from snout tip to caudal tip). The length of the longest (upper) filament on the holotype is equal to more than 2.5 the total length of the fish including caudal. The third filament is nearly as long as the first two, the fourth nearly reaches to caudal tip, the fifth to the anal origin, the sixth to vent, and the seventh to beyond middle of the appressed pelvics. Pelvic fins longer than postorbital part of head. Distance between origins of anal and pelvic fins approximately equal to head length. Vent far in advance of anal fin, between tips of appressed pelvic fins. Air-bladder absent.

Color of alcohol specimens dirty brownish. No black marks visible on pectorals.

Measurements.—Measurements in millimeters of four specimens are given. These are taken from point to point, as indicated, with dividers, not reduced to ideal axial measurements. Under each category the first measurement refers to the holotype, the second to the British Museum paratype, and the third and fourth to two other paratypes.

Standard length 195, 142, 141, 44. Depth at first dorsal origin 53, 34, 35, 26.5. Head length (minus opercular membrane) 53, 37, 36, 28.5. Maxillary length (snout tip to its end) 28, 22, 20, 16. Snout (middle of tip to eye) 12, 7, 8.5, 7. Eye diameter (horizontal) 5.5, 4, 3.5, 3. Interorbital (between fleshy orbital rims) 16, 12, 12, 9.5. Postorbital 38, 28, 24.5, 19.5. Width end maxillary 9, 6, 6.5, 4. Predorsal (snout tip to origin first dorsal) 67, 46, 48, 36. Snout tip to second dorsal origin 113, 82, 83, 63. Least depth caudal peduncle 21, 15, 14.5, 11. Length caudal peduncle (base of last anal ray to middle of end of hypural joint) 46.5, 37, 37, 26. Pelvic origin to anal origin 58, 42, 38, 27.5. Length second spine of first dorsal 35.5, 25.5, 27, broken in smallest example. Length spine of soft dorsal 12.5, 10, 11.5, 9. Length second anal spine 13, 14, 13, 7.5. Length pectoral fin 85, 58.5, 58, 48.5. Length first free pectoral filament of holotype 670 (filaments broken in most of other specimens).

The relationships of *P. hornadayi* are discussed below, under the genus *Polynemus*.

NOTES ON THE GENERA OF POLYNEMIDAE²

In attempting to place the new species described above, I have encountered considerable confusion in the generic classification of this family. After examining the material in the National Museum, I have prepared the following synopsis of the genera, which, while merely tentative, seems to express the general phylogenetic lines in the family better than most systems. The last general review of Polynemid genera was given by Gill (Proc. Acad. Nat. Sci. Philadelphia, 1861, pp. 271–282) and since his revision there has been little improvement in the system and few new characters have been brought forward.

Although the time is not ripe for an exhaustive discussion of the phylogeny of the genera, it appears to me that *Polydactylus* contains the most generalized species, and all of the other genera are more or less direct derivatives of *Polydactylus*-like ancestors. *Eleutheronema* has specialized in the dentition and the elongate, regular body form. *Filimanus* has developed a peculiar physiognomy, long filaments, and a very compressed form, while it has lost the pectoral fold. *Pentanemus* has something of the appearance of *Filimanus*, but has developed a very long anal. *Galeoides* is much like the *plebejus* type of *Polydactylus* but it has a narrow maxillary and has developed numer-

² It should be noted that in the case of Polynemids with very long filaments, such as *Pentanemus* and *Polynemus*, the filaments are brittle and easily broken when the specimens were originally preserved in alcohol. Specimens originally fixed in formalin have the filaments pliable and tough, and not easily broken.

ous filaments extending far forward, with a long pectoral fold to cover them. *Polynemus* is a very distinct branch, which has a specialized shoulder girdle architecture, very long filaments, loss of air-bladder, a slender peduncle, long caudal, sharp head, and small scales. It, too, has lost the pectoral fold in changing the position of the girdle elements. *Polistonemus* is purely an offshoot of *Polynemus*, differing only in the much greater number of filaments. If intermediate species are found, it should not be recognized as a distinct genus.

Synopsis of the Genera

- 1a. Anal fin approximately twice as long as soft dorsal fin, and its origin more anterior than that of the latter; preopercular edge entire; pectoral fin inserted rather high, without a fleshy fold extending from the lower part of its base to cover the bases of one or more of the pectoral filaments; maxillary widened behind, the mouth rather oblique and the snout projecting very little beyond it; pectoral rays all simple; pectoral filaments very long, 5 in number; teeth not extending to outer part of jaws. *Pentanemus* Günther.
- 1b. Anal fin of approximately the same length as soft dorsal fin, or shorter; preopercular edge more or less denticulated.
 - 2a. Pectoral fin inserted low, the upper part of its base much below mid-line of body; lateral line straight or with a faint curve anteriorly.
 - 3a. No sharp fold of skin extending from lower part of base of pectoral fin to cover the bases of one or more of the pectoral filaments; maxillary very wide at end; mouth very oblique; snout squarish and very blunt and projecting little or not at all beyond mouth; scales large; pectoral filaments 7 in number, very long; lateral line angled, with the forward part high though but little curved. *Filimanus*, new genus.
 - 3b. A sharp fold of skin projecting downward or forward from lower end of base of pectoral fin and covering the bases of one or more of the pectoral filaments; mouth chiefly horizontal; snout projecting considerably beyond mouth; pectoral filaments rather short; lateral line nearly straight.
 - 4a. Lower lip absent except towards rictus, the teeth extending on the exterior part of the jaws; elongate, small-scaled species with a very large mouth, long maxillary, and only 3 or 4 pectoral filaments. *Eleutheronema* Bleeker.
 - 4b. Lower lip extending far forward and no teeth on outside of jaws.
 - 5a. Maxillary distinctly widened at its end; pectoral fold little developed. *Polydactylus* Lacépède.

- 5b. Maxillary scarcely widened at its end; pectoral fold very well developed, covering the bases of most of the 9 or 10 pectoral filaments. *Galeoides* Günther.
- 2b. Pectoral fin inserted high, the upper part of its base at mid-depth of body, or higher, without a sharp pectoral fold extending down from lower part of pectoral base to cover the bases of one or more of the pectoral filaments; base of upper pectoral filament inserted higher than lowest ray of pectoral fin; lateral line with its anterior part rising in a long, low curve; caudal peduncle elongate; head small; pectoral filaments very long; maxillary widened behind; no air-bladder.
- 6a. Seven pectoral filaments. *Polynemus* Linnaeus.
- 6b. Fourteen pectoral filaments. *Polistonemus* Gill.

PENTANEMUS Günther

Pentanemus (Artedi) Günther, Cat. Fish. Brit. Mus., 2: 331. 1860 (type by monotypy *Polynemus quinquarius* Linnaeus).

A single species of this genus. *Pentanemus quinquarius* (Linnaeus), from West Africa, is known. I have not seen specimens, but have derived my data from Boulenger's excellent figure and description (Cat. Freshwater Fishes Africa, 4: 100. 1916. fig. 61).

Filimanus, n. g.

This new genus is based upon a single species, the genotype, *Polynemus melanochir* Cuvier and Valenciennes (Hist. Nat. Poiss., 7: 513. 1831), from the Malay Archipelago. I have examined only a single specimen of *Filimanus melanochir*, from Java. (U.S.N.M. 72742).

ELEUTHERONEMA Bleeker

Eleutheronema Bleeker, Versl. Akad. Amsterdam, 14: 110. 1862 (type by monotypy *Polynemus tetradactylus* "C. V." = *P. tetradactylus* Shaw); Bleeker, Versl. Akad. Amsterdam, vol. 14, 1862, p. 123 (description, with inclusion of two species, *P. tetradactylus* and *P. tridactylus* Bleeker).

In the first citation of Bleeker given above he merely lists "*Eleutheronema tetradactylus* Blkr. = *Polynemus tetradactylus* C. V." Since the mere citation, prior to January 1, 1931, of a recognizable, previously described species in conjunction with a new generic name is sufficient under the International Rules (Article 25), this reference validates the generic name *Eleutheronema*. He mentions only one species, *tetradactylus* of Cuvier and Valenciennes, which *ipso facto* becomes the genotype.

Only two species of *Eleutheronema* are currently recognized, *E. tetradactylum*, with four pectoral filaments, ranging from India to Northwestern Australia, and *E. tridactylum*, with three pectoral filaments, from the Malay Peninsula and Archipelago. Of the former, I have examined three specimens in the National Museum, from Rangoon (44726), Java (72740), and Formosa (85481). Of the latter species, I have studied one example (72737) from Java.

POLYDACTYLUS Lacépède

Polydactylus Lacépède, Hist. Nat. Poiss., 5: 419. 1803 (type by monotypy *Polydactylus plumierii* Lacépède = *Polynemus virginicus* Linnaeus).

Trichidion (Klein) Gill, Proc. Acad. Nat. Sci., Philadelphia, 1861, p. 274 (type by original designation *Polynemus plumierii* Lacépède = *Polynemus virginicus* Linnaeus).

Klein's name *Trichidion* was originally published in 1749. It is thus pre-Linnaean and can not be accepted. Walbaum, in 1792 (Artedi Gen. Pisc., pt. 3, p. 585), republished Klein's *Trichidion* but the International Commission on Zoological Nomenclature, in Opinion 21, has declared these reprinted names of Klein to be unavailable under the Code.

This large genus is, as I define it, a very heterogeneous assemblage, but the species all seem to be more similar to each other than to any members of other genera. The range is practically co-extensive with that of the family. Very likely a careful study of adequate material will show a need for breaking it up into several more well knit groups. For example, *Polydactylus quadrifilis* is very different in appearance from the ordinary types such as *virginicus*, *approximans*, and *plebejus*.

I have examined a number of species in the National Museum, including *P. virginicus* (64063), *P. octonemus* (48883), *P. opercularis* (41054), *P. approximans* (65621), *P. sexfilis* (55555; 65990), *P. indicus* (76627), *P. plebejus* (58048), and *P. heptadactylus* (72741).

GALEOIDES Günther

Galeoides Günther, Cat. Fish. Brit. Mus., 2: 332. 1860 (type by monotypy *Polynemus polydactylus* Vahl = *Polynemus decadactylus* Bloch).

This genus contains two species. Of the West African *Galeoides decadactylus* I have examined several specimens from Sierra Leone and Ashantee (U.S.N.M. 42196; 42213). Steindachner, in his Ichthyologische Notizen, No. 8 (Sitzb. Ak. Wien, 60 (1): 137. 1870), has described *Galeoides microps* from China. I have not seen this fish and I find no reference to any examples obtained since the original description.

POLYNEMUS Linnaeus

Polynemus Linnaeus, Syst. Nat., ed. 10, 1758, p. 317 (type as fixed by the International Commission on Zoological Nomenclature, under suspension of the Rules, Opinion 93, 1926, *Polynemus paradiseus* Linnaeus).

The confusion that has reigned in regard to the application of the generic name *Polynemus* has happily been settled (whether on adequate premises or not I do not attempt to say) by the International Commission in Opinion 93 (Smithsonian Misc. Coll., 73: 5-10. 1926.)

In Weber and de Beaufort's useful synopsis of the Indo-Australian Polynemids (Fishes of the Indo-Australian Archipelago, 4: 196-218. 1922), the generic affinities of several of the species, according to the system proposed here, is not evident. In their key to the species of "*Polynemus*" (pp. 201-202) it would seem that all of the species in sections 1 and 2 belong to *Polydactylus*, in addition to *heptadactylus* in section 3. *Polynemus melanochir* is referred above to a new genus, *Filimanus*. *Polynemus longipectoralis*, *P. dubius*, and *P. borneensis* (from which *Trichidion hilleri* of Fowler is distinct) certainly are congeneric with the Indian *P. paradiseus*. *Polynemus macrophthalmus* also probably belongs to this genus. Including *hilleri* and *hornadayi* there seem, then, to be only seven species certainly referable to *Polynemus*. I have seen specimens of none of them save *hornadayi*, but in order to indicate the characters of the new form I have compiled the following key. My data for *paradiseus* is from Day (Fishes of India, p. 176, pl. 42, fig. 4).

Synopsis of the Species

- 1a. Dorsal spines 7, the first more than half as long as the second, which is the longest.
- 2a. Scales 94 to 97; pectoral fin plain, reaching last third of soft dorsal base; upper pectoral filaments more than twice as long as body and caudal fin; snout blunt and broad; eye 9.5 in head, about 3 in interorbital. (Sadong R., Borneo). *P. hornadayi* Myers.
- 2b. Scales 65 to 70 (or slightly more?).
 - 3a. Pectoral fin with most of its terminal portion black; upper pectoral filaments only slightly longer than body and caudal fin. (Baram R., Borneo.) *P. hilleri* (Fowler).
 - 3b. Pectoral fin plain; pectoral filaments exceeding tip of caudal by nearly the length of head and body.
 - 4a. Eye diameter about 3 in interorbital; pectoral fin with 15 rays; upper lobe of caudal longer than lower; scales about 70. (Bay of Bengal and coast of Burma). *P. paradiseus* Linnaeus.
 - 4b. Eye 1.8 in interorbital; pectoral fin with 17 rays; caudal lobes equal; scales 65 to 70. (Sumatra, Borneo, and Siam). *P. dubius* Bleeker.
- 1b. Dorsal spines 8, the first minute, the third one longest.
 - 5a. Pectoral fins about as long as head without snout; eye large, 4.5 to 6 in head; distance between origins of pelvics and anal less than length of head; scales 88 to 93; anal spines 3. (Sumatra and Borneo.) *P. macrophthalmus* Bleeker.
 - 5b. Pectorals longer than head; eye small, 5.5 to 7 or more in head; distance between origins of pelvics and anal more than length of head.
 - 6a. Scales 84 to 87; anal spines 2. (Banjermassin, Borneo.) *P. longipectoralis* Web. & de Bft.
 - 6b. Scales 65 to 66; anal spines 3. (Sumatra and Borneo.) *P. borneensis* Bleeker.

POLISTONEMUS Gill

Polistonemus Gill, Proc. Acad. Nat. Sci. Philadelphia, 1861, p. 277 (type by original designation *Polynemus multifilis* Schlegel).

This genus is in all respects a *Polynemus* excepting for the increased number of pectoral filaments. I have examined two fine examples of *Polistonemus multifilis* (U.S.N.M. 53409; 53410) collected in the Kapoeas River, Borneo, by Dr. W. L. Abbott. This is the only known species.